



MDC Resource Science

Acorn Production Across an Elevation Gradient in the Ozarks

Science Notes



Acorn Production Across an Elevation Gradient in the Ozarks



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Summary

Many factors can affect the amount of acorns produced each year. These elements can range from tree level genetics to landscape geology. The interaction of these factors across multiple scales leads to great variation in the amount of acorns available both spatially and annually. One factor that has not been greatly explored is local elevation gradients in topographically diverse areas such as the Missouri Ozarks. Managers have recently shown interest in this relationship with anecdotal evidence that acorn production differs across elevation. To explore this relationship, acorn data was used from the nine Missouri Ozark Forest Ecosystem Project (MOFEP) hardmast study sites in Carter, Shannon, and Reynolds counties (Fig. 1).

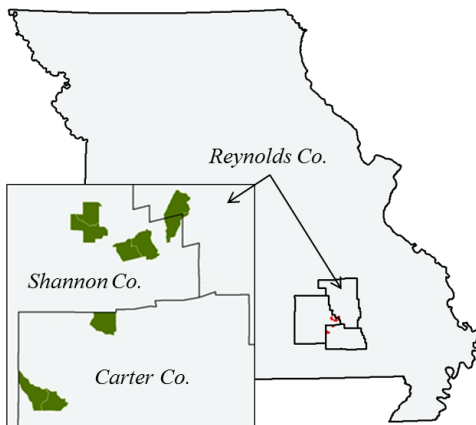


Figure 1.
MOFEP sites

So even with possible intermediate interactions, do resulting mast crops indicate a direct relationship between acorn production and elevation?

Results

Total acorn production tends to increase with greater elevation (Fig. 2). Oaks can usually occur at any location in the landscape, so this correlation is not merely due to the presence of oak species. The time period in which these data were collected has also included some years of severe weather conditions such as drought, flood, and growing season freezes. Oak is susceptible to reduced acorn production due to extremes of such variables, yet the elevational correlation was still strong overall. While the exact mechanism is unknown, this indicates that the elevation of a given location could

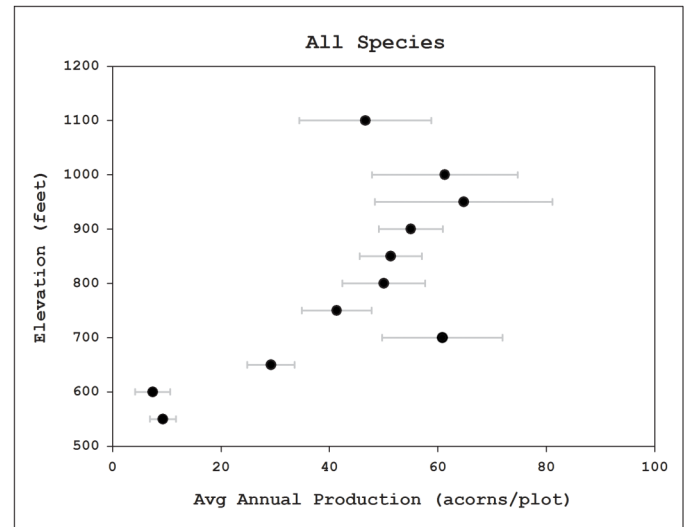


Figure 2. Results indicate a strong positive correlation between acorn production and elevation when all oak species are analyzed collectively ($r = .734$, $p = 0.010$)

serve to dampen negative effects of more extreme conditions on resulting acorn crops.

Management Implications

Further analyses are needed to examine the nature and strength of the relationship between acorn production and elevation. However, simply knowing what to expect of potential production can be a useful tool for efficiently implementing management activities. Although elevation cannot be changed, it can be considered in habitat planning. For example, many species including deer, turkey, and elk may depend on acorns for up to 50% of their diet in the fall and winter. Availability of acorns then affects survival, health, and reproductive ability but many species also require more open habitat as well. Providing more open habitats at lower elevations with already reduced mast potential would allow greater retention of mature mast producing trees in higher elevations with greater production, thereby providing more constant acorn availability. Likewise, silvicultural planning efforts could use this information in determining harvest prescriptions where mast production is a desired effect. Again, use of uneven aged or basal area retention methods could be more appropriate at higher elevations so that mast production potential is maintained.

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